LETTER TO THE EDITOR

MODIFICATION OF ADRENALINE MYDRIASIS BY AGENTS ACTING ON
SULPHHYDRYL GROUPS

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Sir,

Topical adrenaline, owing to its weak penetrability through the membrane, does not evoke mydriasis readily in animals and man (3). Adrenaline-evoked mydriasis is due to the contraction of the radial muscle of the iris as a result of alpha-adrenoceptor stimulation (3). The alpha-adrenoceptor activity requires sulphydryl radicals in the tissues (2,5). Further, sulphydryl agents are known to cause changes in membrane permeability (2,6) and the alpha adrenoceptor function (2,5). In view of this, the influence of two sulphydryl agents viz. parachloromercuribenzoate (PCMB) and penicillamine, the former being the sulphydryl inactivator and the latter the sulphydryl activator of the tissue sulphydryl radicals, were studied on adrenaline-evoked mydriasis in rabbits.

Six sets of experiments were performed. Each set employed 3 rabbits randomly selected. The rabbit was placed in a cage on a level table in daylighted room. The pupillary diameter of both the eyes from the sides was measured every two min by a flexible millimeter calibrated scale. The right eye served as control and was treated with either distilled water or sulphydryl agents. The left eye was used for treating with adrenaline or adrenaline + sulphydryl agents. Only two drops of the test drugs were instilled into the conjunctival sac once and the eyelids closed thereafter for 2 min. Care was taken in handling the animal and gentle approach was made to the animal for the measurement procedure so that the excitatory sympathoadrenal discharge-induced mydriasis was prevented. Error in measurement due to parallax was also avoided. Aqueous solutions of the drugs were used. Adrenaline tartrate was prepared as 1 : 1000 aqueous solution; PCMB and penicillamine aqueous solutions were prepared in concentrations of 18 : 1000 and 1 : 1000 respectively.

PCMB and penicillamine did not modify the initial pupillary diameter on conjunctival instillation. Adrenaline caused slight mydriasis by 3.4 mm. Topical PCMB antagonised adrenaline-mydriasis. Topical penicillamine potentiated adrenaline mydriasis in intensity by 3.2 mm and in duration by 10-15 min (Fig. 1). The temporal curve of
adrenaline mydriasis after topical penicillamine and PCMB resembled the control adrenaline mydriasis curve. There was no sign of irritation due to PCMB and penicillamine such as congestion and lacrymation.

The temporal curve of adrenaline mydriasis in intensity and duration on topical application. This could have been due to penicillamine-induced enhancement of penetrability of adrenaline through the corneal conjunctival membrane, so that greater amount of adrenaline reached the iris-the site of its action. Sulphydryl agonist-agents have been reported to increase cell membrane permeability (1.6). The observed potentiation of adrenaline mydriasis could be due to the agonist-like activity of penicillamine for the membrane sulphydryl radicals. Besides, sulphydryl radicals are functionally associated with the alpha adrenoceptor activity as reported by Goldman and Hadley (2): penicillamine might have been acting by sensitizing this receptor site to adrenaline. PCMB the tissue sulphydryl inactivating agent antagonised
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References